BIOEMERGER

Bioemerger project: Biotechnological solutions for the sustainable management of polyurethane foam waste

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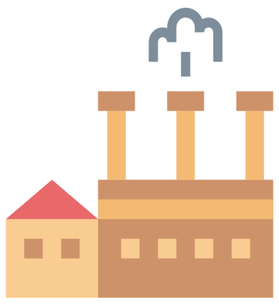
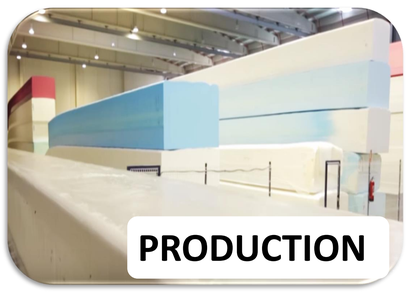
EFIB 2021

CURRENT LINEAL MODEL



INDUSTRY

FLEXIBLE POLYURETHANE FOAMS



MANUFACTURE

USE

WASTE

TARGET CIRCULAR MODEL

Aims to investigate **sustainable solutions** for the **management of polyurethane foam waste** within the framework of **biotechnology** through **3 different strategies**:

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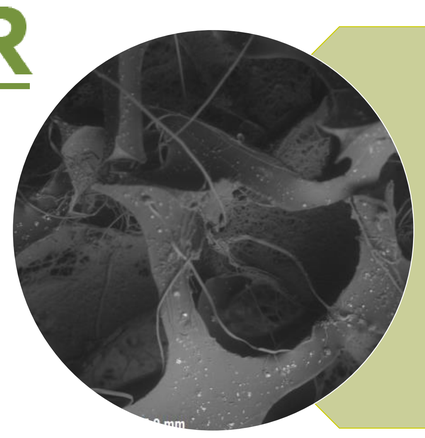
Start date:
January 2019
End date:
December 2022



Biodegradation

Testing and selection of the most efficient polyurethane biodegrading microorganisms, insects and enzymes; analyzing changes in structural, chemical and mechanical properties in foams

Recycling

Using green chemistry (enzymes, innovative solvents) to design and set up catalytic reactions for the recovery of raw materials (polyols and isocyanate) from polyurethane

Valorization

Study the valorization polyurethane foam waste in different industries: as substrates for hydroponic cultures in the agricultural sector and as feedstock for the synthesis of fuels and biogas in the energy sector

www.bioemerger.es

interplasp espumas de poliuretano
European flexible polyurethane foam manufacturer

MICROGAIA BIOTECH
Biotech company, bioproducts for sustainable agriculture

CEBAS CENTRO DE EDAFOLOGÍA Y BIOLOGÍA APLICADA DEL SEGURA
Research Center for Edaphology and Applied Biology

CETEM
Technological Research Centre of Wood and Furniture

CETENMA Centro Tecnológico de la Energía y del Medio Ambiente
Technology Center for Energy and the Environment

ACHIEVED GOALS :

- Areas of mattress accumulation, such as landfills, were accessed to detect microorganisms implied in foam biodegradation, identifying several bacterial and fungal strains that was selected due to their polyurethane degradation capacity, just as the enzymes involved in these processes.
- A specific species of insect showed a high rate of polyurethane foam biodegradation (60%)
- Polyol has been recovered from the depolymerization of polyurethane foam by hydrolysis in ionic liquids.
- Polyurethane foam waste demonstrated to improve the water retention capacity of vegetal substrates, enhancing plant growth without affecting toxicity or nutritional properties of vegetables.

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